

I claim the following:

1. A gravimetric blender comprising:

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- a. a vertically elongated housing having a transparent panel for operator viewing of blender operation within said housing;
- b. a material storage hopper removably mounted on said housing, comprising:
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- i. means proximate the hopper bottom for selectively dispensing material within said hopper into said housing; and
- ii. means connected to said hopper and remaining so upon removal of said hopper from said housing, for actuating said material dispensing means;
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- c. a weigh bin connected to said housing below said hopper;
- d. means connected to said housing for sensing weight of material in said bin; and
- e. a lower portion of said housing defining a mix chamber below said weigh bin.

2. The blender of claim 1 wherein said panel extends the vertical length of said housing.

3. The blender of claim 1 wherein said housing includes upwardly extending surfaces and said panel defines one of said surfaces.

4. The blender of claim 1 wherein said panel is removable.

25 5. The blender of claim 3 wherein said panel is removable.

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A2 ✓ 6. The blender of claim 3 wherein a plurality of said
upwardly NA
vertically extending surfaces are formed integrally of a
single piece.

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5 7. The blender of claim 3 wherein said upwardly extending
surfaces are vertically oriented.

8. The blender of claim 3 wherein said upwardly extending
surfaces are planar.

9. A gravimetric blender comprising:

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a. a vertically elongated rectangular frame having a
plurality of sides extending substantially the vertical
height of said housing, one of said sides affording
inspection and access to the housing throughout its
height, said frame having a cradle at the top;

15 b. a material storage hopper removably mounted on said
frame cradle and comprising means within said hopper
and proximate the hopper bottom for dispensing material
within said hopper;

c. a weigh bin connected to said frame below said hopper;

20 d. means connected to said frame for sensing weight of
material in said bin; and

e. a mix chamber below said weigh bin.

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25 10. The gravimetric blender of claim 9 wherein said means for
dispensing material within said hopper includes a valve and
means for actuating said valve, wherein said valve and said
valve actuating means are fixedly connected to said hopper.

11. The blender of claim 10 wherein said actuating means is at least partially within said hopper.
12. The blender of claim 11 wherein said valve means is at least partially within said hopper.
- 5 13. The blender of claim 10 wherein said actuating means is fully within said hopper.
14. The blender of claim 11 wherein said valve means is fully within said hopper.
- 10 15. The blender of claim 9, said frame having four sides with diverging guide flaps projecting upwardly from the top of said sides forming said cradle with an open-top, wherein ✓ said hopper with (said valve and actuating means) affixed thereto is seated in said cradle so as to be manually removable from said housing.
- 15 16. The blender of claim 9 further comprising a plurality of hoppers, each with valve means therewithin and respective individual valve actuation means. *amended to meet dispenser mns in 9*
- 20 17. The blender of claim 9 wherein said actuating means is pneumatically driven and includes a vertically elongated member for transmitting motion to said valve. *MA*
- ✓ 18. The blender of claim 9 wherein said actuating means comprises a piston-cylinder combination connected to said hopper wall. *MA*
- 25 19. The blender of claim 9 further comprising means connected to said frame for selectively contacting and opening said bin

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to release material in said bin downwardly into said mix chamber.

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5 20. The blender of claim 19 further comprising an openable portion of said bin, and means to bias said portion to a closed position.

21. The blender of claim 20 wherein said openable portion is movable about a pivot.

22. The blender of claim 21 wherein said openable portion pivots about a horizontal axis

10 23. The blender of claim 19 wherein said means for selectively contacting and opening said bin is pneumatically actuated.

24. The blender of claim 19 wherein said means for selectively contacting and opening said bin is a piston-cylinder combination.

15 25. The blender of claim 24 wherein said cylinder is outboard of said housing.

26. The blender of claim 24 wherein said piston moves transversely to the axis about which said openable portion pivots.

20 27. The blender of claim 20 wherein said bin openable portion has an operator to pivot said portion away from said closed position.

✓ 28. The blender of claim 27 wherein said piston contacts said bin operator.

29. The blender of claim 20 wherein said openable portion is pivotally connected to a remaining, stationary portion of said bin.

30. The blender of claim 9 wherein said frame is a single piece of material.

31. The blender of claim 30 wherein said frame is steel.

32. The blender of claim 30 wherein said frame has three sides, two of which are parallel and perpendicular to the remaining side.

33. The blender of claim 30 wherein said frame extends vertically upwardly in a straight line from the bottom of said blender to said hopper.

34. The blender of claim 30 wherein one side of said frame is open.

35. The blender of claim 30 further comprising an upwardly extending removable panel adapted for fitting together with said frame to provide an enclosure for said weigh bin.

36. A gravimetric blender comprising:

a. a housing;

b. a weigh bin mounted on said housing, having an aperture at the bottom thereof and comprising;

i. a movable weigh pan defining a portion of the bin bottom;

ii. a sloped section forming a portion of said bin bottom and extending downwardly from a bin side;

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iii. remaining sides of said bin having co-planar lower extremities;

iv. at least a central part of said pan when said aperture is open being below said sloped portion;

5 c. means, connected to said housing, for sensing weight of material in said bin;

d. a mix chamber below said bin and connected to said housing including mixing means therewithin;

10 e. means for selectively moving said pan between a position covering said aperture at which said pan defines a portion of said bin bottom and a position at which said aperture is open for releasing material in said bin downwardly into said mix chamber.

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15 37. The blender of claim 36 wherein said sloped section is planar.

38. The blender of claim 36 wherein said remaining sides of said bin are of common vertical height.

39. The blender of claim 36 wherein said central part of said weigh bin in said aperture uncovering position is parallel with said sloped section. MA

40. The blender of claim 36 wherein said central part of said weigh bin and said aperture uncovering position is under said sloped section. MA

41. A gravimetric blender comprising:

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c. ~~said weigh bin connected to said frame below said
hopper;~~

e. said mix chamber below said bin and receiving material therefrom including rotatable mixing means therewithin

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with said frame to close said enclosure, ^{at the opening of} and
disconnection from said frame to open said enclosure,
said panel being transparent;

thin;
a structure }
is the open side
of part a being
closed by the
panel.

✓

- (g) to said mixer and operable to disconnect said mixer from said drive means upon disconnection of said panel from said frame.

- 20 ✓ 42. The blender of claim 41 wherein said means¹⁰ connecting said mixer to said panel for axial movement of said¹⁰⁰ shaft responsively to said panel disconnecting from said frame provides movement of said mixer unitarily with said panel upon panel disconnection.

43. The blender of claim 42 wherein said connection means comprises a metal strap spanning across said open side in registry with said mix chamber.
44. The blender of claim 43 including clips between the strap and said frame releasably mounting said strap on said frame.
45. The blender of claim 44 wherein said strap is disposed on the outer side of said transparent panel, and retains said panel in place on said frame.
46. The blender of claim 44 wherein said mixer axis is perpendicular to said panel.
47. The blender of claim 44 further comprising drive means for supplying rotary motion to said mixer through an arc.
48. The blender of claim 47 wherein said motion supplied by said drive means is a fixed arc.
49. The blender of claim 47 wherein said drive means reciprocates said mixing means through said arc in opposite directions.
50. The blender of claim 47 wherein said arc is less than a full circle.
51. The blender of claim 47 wherein said arc is greater than a full circle.
52. The blender of claim 47 wherein said drive means reciprocates said mixing means through arcs which are less than full circles.
53. The blender of claim 47 wherein said drive means is pneumatically driven.

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54. A valve for vertically dispensing a precisely controlled flow of granular material from a material storage device having a discharge orifice at a lower extremity thereof, comprising:

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- a. a axially reciprocable tubular member axially aligned with and slidably axially upward and downward within said orifice, having a lateral port formed therein remote from the vertical extremities of said member, a lower end of said tubular member being open to define a discharge orifice for granular material dispensed thereby;
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- b. a chamber at least partially surrounding said tubular member, having an open lower end confronting and spaced above said orifice;
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- c. said chamber open end affording flow of material from said storage device through said port and into said tubular member when said port member is at a first position below said open end, said port being spaced upwardly from said open end when said tubular member is at a second position; and
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- d. pneumatic means for vertically moving said tubular member between said first and second positions.

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55. A valve for dispensing granular material through a discharge orifice in the lower portion of a material storage device, comprising:

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- a. a longitudinally elongated, at least partially hollow, member connected to the interior of said storage device, aligned with said orifice and reciprocally movable therewithin, having a lateral port removed from longitudinal extremities of said member, said member having an open lower end defining a valve opening for granular material to be dispensed therethrough;
- b. a stationary chamber connected to the interior of said storage device, extending around said member;
- 10 c. said chamber overlying said port and thereby blocking access thereto by said granular material within said storage device through a portion of said range of said reciprocal motion; and
- 15 d. means for reciprocating said member longitudinally from a position in which said chamber blocks direct access from the interior of said storage device to said port, and a second position in which said port directly confronts the interior of said storage device.

20 56. The valve of claim 55 including control means to initiate operation of said reciprocating means to cause flow of material from the interior of the storage device through the hollow member, and to arrest operation of said reciprocating means to arrest flow.

25 57. The valve of claim 56 wherein said control means effects pulsating longitudinal displacement of said member between said initiation and said arrest of the flow.

58. The valve of claim 55 including a wall extending from below the lower side of said port within said hollow member upwardly beyond the upper side of said port, said wall blocking downward flow from said port through the hollow member but affording upward flow through said member along the side of the wall confronting said port, said wall terminating at its upper end in a weir affording downward flow through said hollow member and the orifice along the side of the wall opposite to the said side of the wall confronting said port.

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